

Claims

What is claimed is:

1. A method of processing a video signal for transmission over a heterogeneous network, the method comprising the step of:

5 coding the video signal in a progressive video coder so as to generate a progressive coded video bit stream, wherein the progressive coded video bit stream is configured to be decodable at any one of a series of increasing bit rates up to a maximum bit rate, depending on which of a number of corresponding portions of the progressive coded video bit stream are received by a decoder, and wherein each of the series of increasing bit rates produce progressively better
10 reconstructed video quality at an output of the decoder;

transmitting the progressive coded video bit stream over a first part of the heterogeneous network at a first one of the bit rates; and

15 selectively transmitting one or more of the portions of the progressive coded video bit stream from the first part of the heterogeneous network to a second part of the heterogeneous network, the one or more portions being associated with a second one of the bit rates lower than the first bit rate, the one or more portions and the associated second bit rate being selected based at least in part on one of more of: (i) an error detected in the transmission over the first part of the heterogeneous network; and (ii) a characteristic of the second part of the heterogeneous network.

20 2. The method of claim 1 wherein the progressive coded video bit stream corresponds to a given group of frames of the video signal.

25 3. The method of claim 1 wherein each of the corresponding portions is associated with a different bit rate.

4. The method of claim 1 wherein each of at least a subset of the corresponding portions are associated with different frame rates.

5. The method of claim 1 wherein each of at least a subset of the corresponding portions are associated with different spatial resolutions.

6. The method of claim 1 wherein each of at least a subset of the corresponding portions are associated with different signal-to-noise ratios.

7. The method of claim 1 wherein the particular portions of the progressive coded video bit stream which are received over the first part of the heterogeneous network determine a corresponding amount of the bit stream that will be transmitted over the second part of the heterogeneous network to the decoder for decoding at a particular one of the series of increasing bit rates.

8. The method of claim 1 wherein the first part of the heterogeneous network comprises a wired network connection and the second part of the heterogeneous network connection comprises a wireless network connection.

9. The method of claim 8 wherein the wired network connection comprises a wired Internet connection, and the wireless network connection comprises a wireless channel to a mobile receiver associated with the decoder.

10. An apparatus for use in processing a video signal, the video signal being coded so as to generate a progressive coded video bit stream, wherein the progressive coded video bit stream is configured to be decodable at any one of a series of increasing bit rates up to a maximum bit rate, depending on which of a number of corresponding portions of the progressive coded video bit stream are received by a decoder, and wherein each of the series of increasing bit rates produce progressively better reconstructed video quality at an output of the decoder, the progressive coded video bit stream being transmitted over a first part of the heterogeneous network at a first one of the bit rates, the apparatus comprising:

a network element coupled between the first part of the heterogeneous network and a second part of the heterogeneous network, the network element being operative to selectively transmit one or more of the portions of the progressive coded video bit stream from the first part of the heterogeneous network to the second part of the heterogeneous network, the one or more portions being associated with a second one of the bit rates lower than the first bit rate, the one or more portions and the associated second bit rate being selected based at least in part on one of more of: (i) an error detected in the transmission over the first part of the heterogeneous network; and (ii) a characteristic of the second part of the heterogeneous network.

11. The apparatus of claim 10 wherein the progressive coded video bit stream corresponds to a given group of frames of the video signal.

12. The apparatus of claim 10 wherein each of the corresponding portions is associated with a different bit rate.

13. The apparatus of claim 10 wherein each of at least a subset of the corresponding portions are associated with different frame rates.

14. The apparatus of claim 10 wherein each of at least a subset of the corresponding portions are associated with different spatial resolutions.

15. The apparatus of claim 10 wherein each of at least a subset of the corresponding portions are associated with different signal-to-noise ratios.

16. The apparatus of claim 10 wherein the particular portions of the progressive coded video bit stream which are received over the first part of the heterogeneous network determine a corresponding amount of the bit stream that will be transmitted over the second part of the heterogeneous network to the decoder for decoding at a particular one of the series of increasing bit rates.

17. The apparatus of claim 10 wherein the first part of the heterogeneous network comprises a wired network connection and the second part of the heterogeneous network comprises a wireless network connection.

5 18. The apparatus of claim 17 wherein the wired network connection comprises a wired Internet connection, and the wireless network connection comprises a wireless channel to a mobile receiver associated with the decoder.

10 19. An article of manufacture comprising a storage medium for storing one or more software programs for use in processing a video signal for transmission over a heterogeneous network, the video signal being coded so as to generate a progressive coded video bit stream, wherein the progressive coded video bit stream is configured to be decodable at any one of a series of increasing bit rates up to a maximum bit rate, depending on which of a number of corresponding portions of the progressive coded video bit stream are received by a decoder, and wherein each of the series of increasing bit rates produce progressively better reconstructed video quality at an output of the decoder, the progressive coded video bit stream being transmitted over a first part of the heterogeneous network at a first one of the bit rates, wherein the one or more programs when executed implement the step of:

15 selectively transmitting one or more of the portions of the progressive coded video bit stream from the first part of the heterogeneous network to a second part of the heterogeneous network, the one or more portions being associated with a second one of the bit rates lower than the first bit rate, the one or more portions and the associated second bit rate being selected based at least in part on one of more of: (i) an error detected in the transmission over the first part of the heterogeneous network; and (ii) a characteristic of the second part of the heterogeneous network.

20 20. A video transmission system comprising:

25 a progressive video coder operative to code a video signal so as to generate a progressive coded video bit stream, wherein the progressive coded video bit stream is configured to be decodable at any one of a series of increasing bit rates up to a maximum bit rate, depending

on which of a number of corresponding portions of the progressive coded video bit stream are received by a decoder, and wherein each of the series of increasing bit rates produce progressively better reconstructed video quality at an output of the decoder;

5 a heterogeneous network comprising at least a first part and a second part, the progressive coded video bit stream being transmitted over the first part of the heterogeneous network at a first one of the bit rates; and

10 a network element coupled between the first part of the heterogeneous network and the second part of the heterogeneous network, the network element being operative to selectively transmit one or more of the portions of the progressive coded video bit stream from the first part of the heterogeneous network to the second part of the heterogeneous network, the one or more portions being associated with a second one of the bit rates lower than the first bit rate, the one or more portions and the associated second bit rate being selected based at least in part on one of more of: (i) an error detected in the transmission over the first part of the heterogeneous network; and (ii) a characteristic of the second part of the heterogeneous network.

